

### **Abstract**

A cryogenic air separation system that optimizes the recovery of argon includes an air intake, a high-pressure distillation column, a low-pressure distillation column, a crude argon distillation column, and a controller that automatically controls the composition of the raw argon stream to decrease the concentration of oxygen in the stream while preventing the concentration of nitrogen in the crude argon stream from exceeding a selected value. In addition, the controller also controls the composition of the crude argon stream until an oxygen concentration of the crude argon stream reaches a selected value. The controller may include a multivariable predictive controller.

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